OIPE
MAY 03 2005
PATENT & TRADEMARK OFFICE

Fig. 1

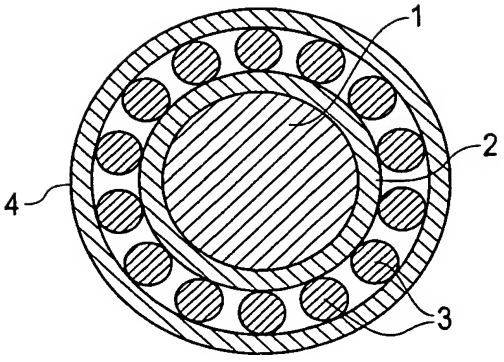


Fig. 2

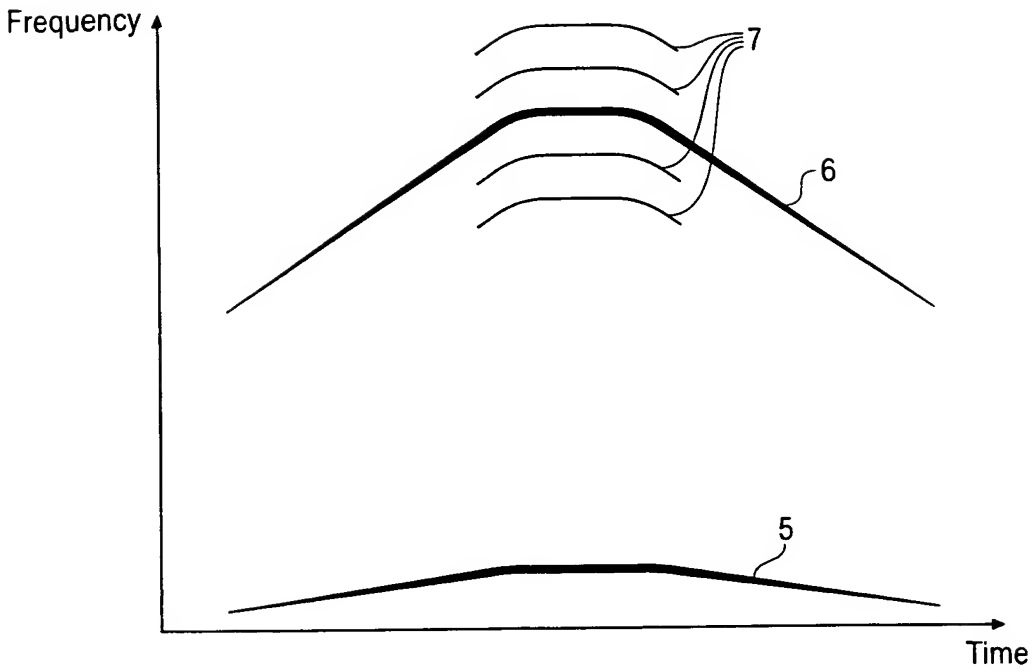


Fig. 3

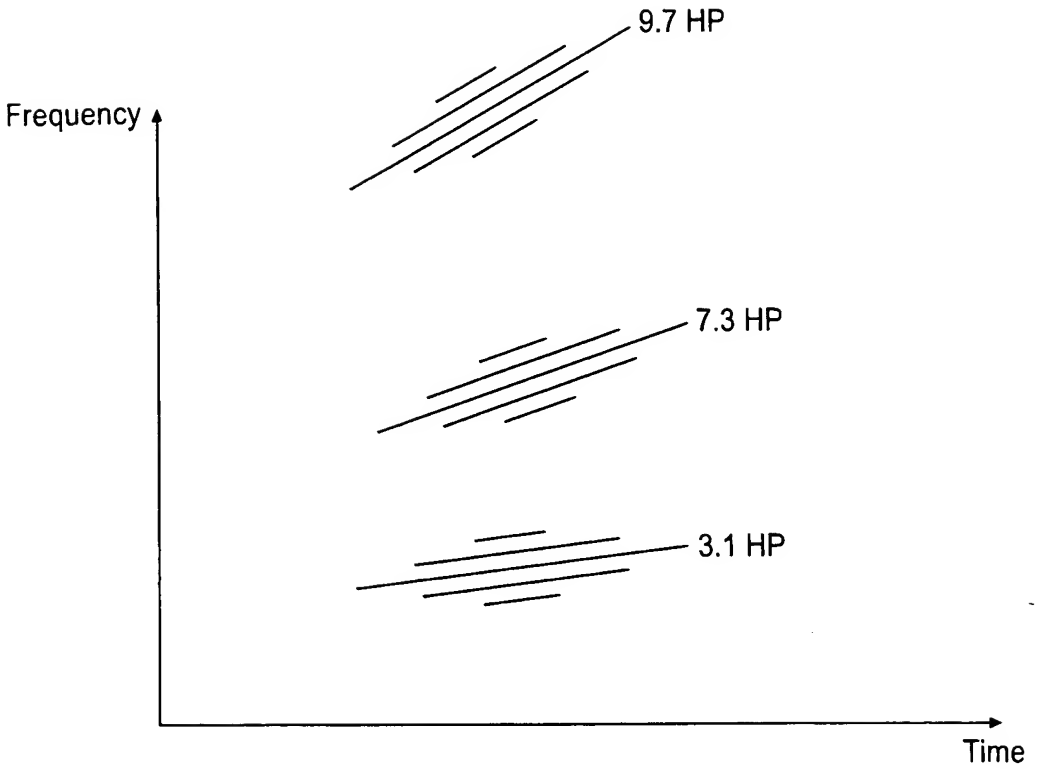


Fig. 4.

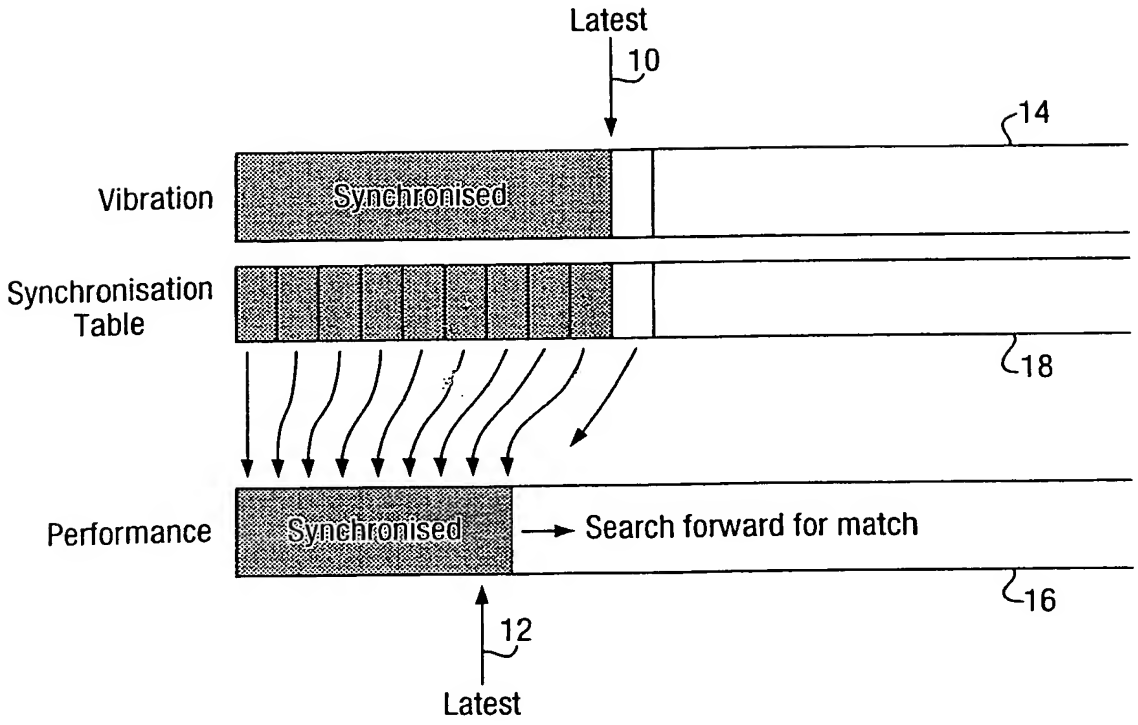
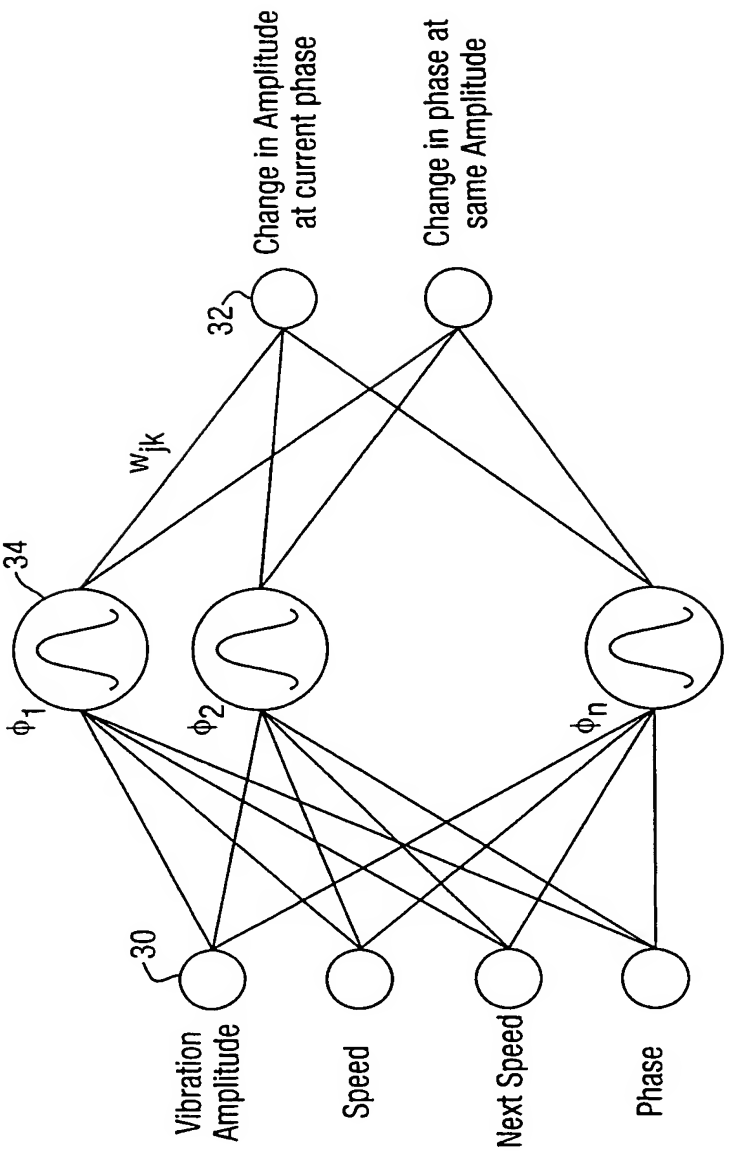

Latest
10
14
Vibration
Synchronised
Synchronisation Table
18
Performance
Synchronised
Search forward for match
16
12
Latest

Fig. 5.


Change in Amplitude at current phase
Change in phase at same Amplitude
32
w_{jk}
34
ϕ_1
ϕ_2
ϕ_n
30
Vibration Amplitude
Speed
Next Speed
Phase

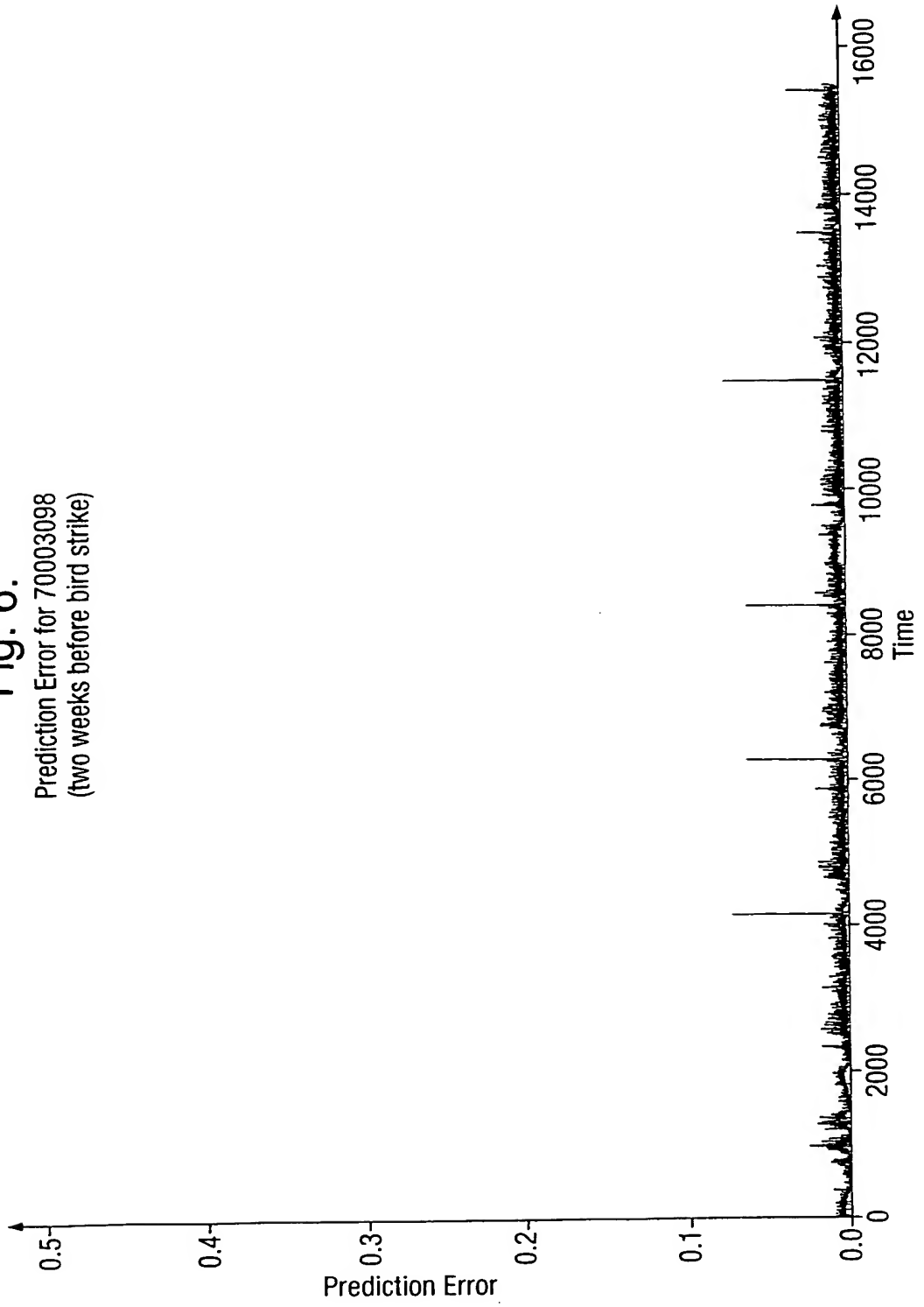


Fig. 6.
Prediction Error for 70003098
(two weeks before bird strike)

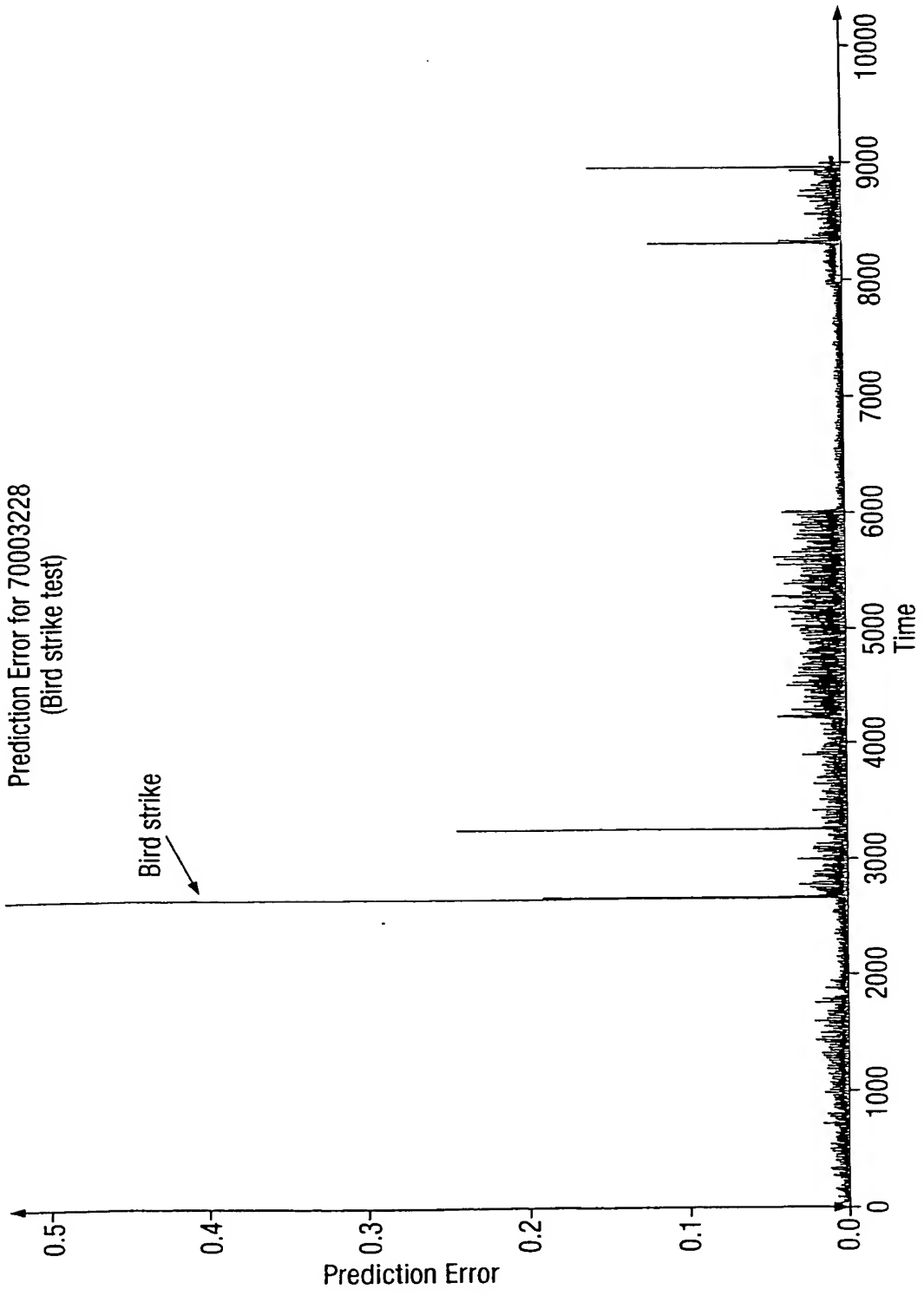

Prediction Error for 70003228
(Bird strike test)
Bird strike
Prediction Error
0.5
0.4
0.3
0.2
0.1
0.0
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
Time

Fig. 7.

Fig. 8.

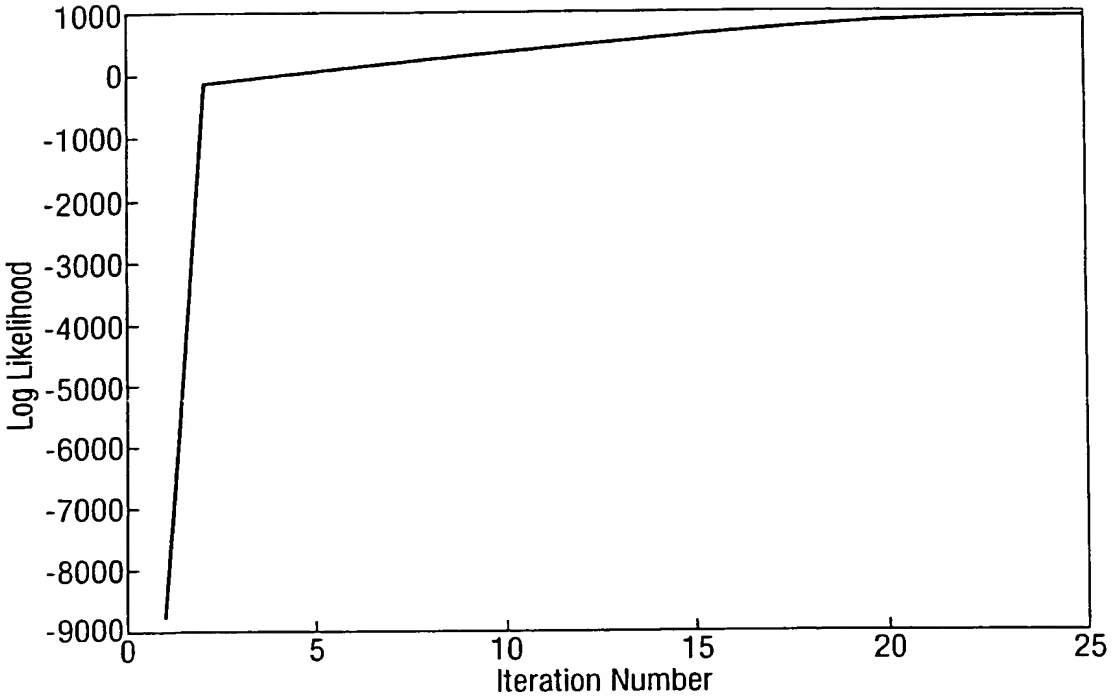

1000
0
-1000
-2000
-3000
-4000
-5000
-6000
-7000
-8000
-9000
Log Likelihood
0
5
10
15
20
25
Iteration Number

Fig. 9.

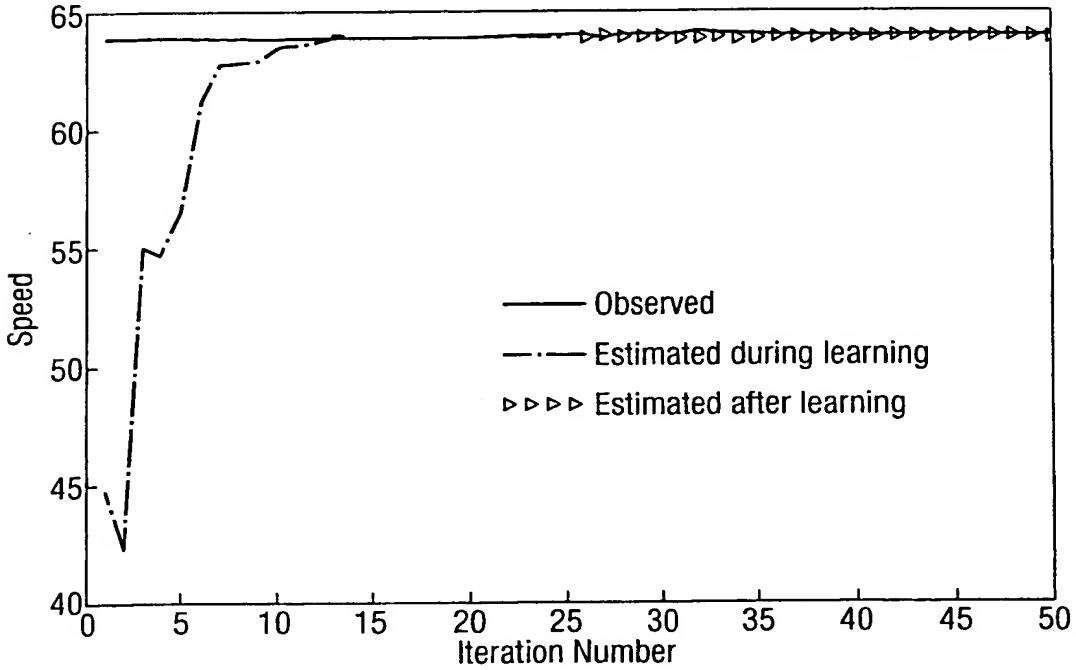
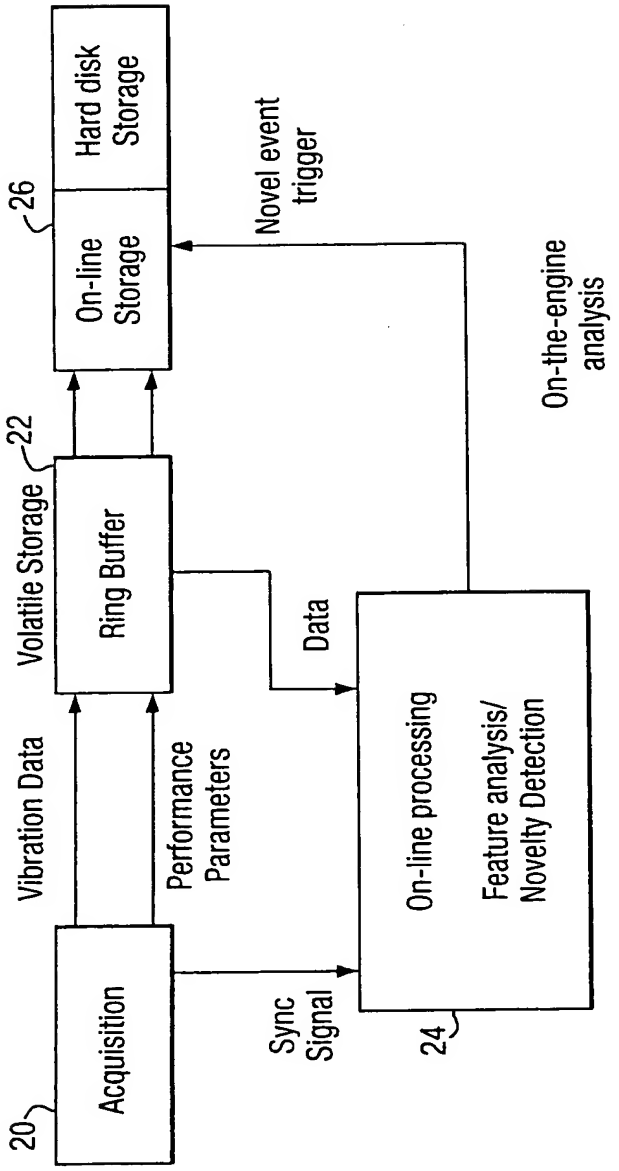

65
60
55
50
45
40
Speed
0
5
10
15
20
25
30
35
40
45
50
Iteration Number
Observed
Estimated during learning
Estimated after learning

Fig.10.


Hard disk Storage
26
On-line Storage
Novel event trigger
On-the-engine analysis
22
Volatile Storage
Ring Buffer
Data
Vibration Data
Performance Parameters
On-line processing
Feature analysis/ Novelty Detection
Sync Signal
24
20
Acquisition